pioneered by U.S. companies. Satellites are critical to the distribution of broadcast and cable programming, international telephone and video traffic, newsgathering, fixed and mobile communications in remote areas, and position location. With the growth of satellite networks using Very Small Aperture Terminals (VSATs), satellites are now widely used for domestic and international private networks that each have hundreds and thousands of users. The recent launch of high-power Direct Broadcast Service was the most successful introduction of a new consumer technology in recent history.

New satellite systems are under construction or proposed for new services that include worldwide mobile communications to handheld terminals, digital audio services, and two-way broadband service to small terminals. Again, U.S. companies have been leading these efforts and the U.S. government has been the driving force at conferences of the International Telecommunication Union in securing the necessary spectrum allocations for these new systems.

The basis for satellite's success is its ability to provide certain kinds of services very efficiently. These include: (i) wide area service (including regional and global service) that provides economies of scale, including particularly for service to rural and remote areas, and (ii) point-to-multipoint and multipoint-to-point service. The satellite industry also has demonstrated a unique ability to continually improve its technology and increase the capacity of its offerings. Typical satellites being manufactured and launched in 1996 offer several orders of magnitude more capacity than those being launched in the 1970's and permit users to communicate with equipment that is orders of magnitude smaller and less expensive than was practical with earlier generation satellites.

The extent and importance of U.S. leadership in satellite technology and services cannot be exaggerated. Just imagine for a moment that the Global Positioning System or the Big LEO systems were developed using Japanese or Russian technology and you get an idea of how we have come to take for granted the U.S. position in this industry and what it means to our nation.

Much of the credit for the success of the U.S. satellite industry must go to the U.S. government and, particularly, the Commission. Recognizing the unique qualities of satellites and their importance in providing certain services that would otherwise be impossible or impractical, NASA and the Defense Department have invested substantial amounts in research and development, and the FCC has allocated substantial spectrum for satellite services. In addition, the FCC has adopted flexible licensing policies for satellite systems that have prevented many of the logjams that characterized the licensing of other services.

In some circumstances, satellite services can share spectrum with other services. For instance, in the C band, the Fixed Satellite Service shares frequencies with microwave licensees by coordinating the siting of their respective facilities. The Big LEO MSS systems will share frequencies with Radio Astronomy by controlling emissions from mobile equipment when in the vicinity of certain observatories that monitor frequencies in the Big LEO uplink band. Little LEO systems will share their uplink frequencies with land mobile and other terrestrial services.

Many satellite services are characterized by intraservice sharing of spectrum. Two Little

LEOs will share the same frequencies by using a dynamic band-scanning technique designed to prevent their systems from operating at the same time on the same frequencies. Certain of the Big LEOs share the same frequencies by using CDMA technology. GSO FSS systems typically share spectrum by operating from different orbital locations that are sufficiently separate to prevent interference. Use of different polarizations is another sharing technique. As a general matter, the satellite industry has been very cooperative in developing more efficient ways to use and share satellite spectrum. Over the years, satellite capacity has expanded by several orders of magnitude, and no qualified satellite applicant has been unable to secure the spectrum that it needed to operate.

II. Spectrum Allocations

As with other radio frequencies, the international allocation process is governed by the now biennial conferences of the ITU referred to as World Radiocommunication Conferences or "WRCs." In the case of satellite allocations, these conferences are critical. Due to the nature of satellite communications, with its typically broad beam patterns and, in the case of non-geostationary satellites, their global orbits, spectrum allocations typically must be on an international or at least regional basis.

At recent conferences, the U.S. has been a leading proponent of new satellite allocations. At the 1995 conference, the U.S. successfully proposed substantial new allocations for Teledesic's non-geostationary broadband system and for Big LEO feederlinks. At the 1992 conference, the U.S. successfully proposed the basic allocation for the Big LEO systems and for other, new MSS systems.

Domestic allocations of satellite spectrum are necessarily closely related to the international allocations. In years past, when there was less demand for spectrum, particularly in the higher frequencies, the Commission was able to plan further ahead and set aside certain frequencies for future satellite development. Thus, for instance, portions of the L band were allocated for Mobile Satellite Service as early as the 1970's and the Ku and Ka bands were allocated for satellite services well in advance of any specific proposed use. This permitted orderly planning and technology development by the industry. NASA Advanced Communications Technology program for instance, invested hundreds of millions of dollars in the development of technology for satellites in the Ka band.

In recent years, as spectrum has grown more scarce and the pace of technology development has quickened, spectrum allocations have been driven more by specific proposals with immediate needs. For instance, this was the case with the Little and Big LEOs.

SIA supports the following policies with respect to satellite spectrum allocations:

1. Add new satellite allocations based on identified demand and the need to plan for technology development

   The U.S. satellite industry has demonstrated the capacity to develop new

technology and services that can contribute substantially to consumer welfare and to the health of the U.S. economy. For the industry to remain dynamic and robust, it must have sufficient spectrum to grow. The Commission must act quickly and with a steady hand to preserve and identify new satellite spectrum as needed.

2. Permit satellite system operators to have maximum flexibility in the use of their spectrum

SIA supports satellite licensees' having the flexibility to use their satellites to provide a range of services in the most efficient manner possible. Satellite system operators have demonstrated that they will use that flexibility to develop new services that will benefit consumers. To the extent that it is consistent with international allocations, satellite licensees should be given broad flexibility to provide whatever services they can, as long as the provision of other services does not adversely affect a satellite system's ability to offer the satellite services that it is designated to provide.

3. Do not use market-based mechanisms to allocate spectrum between satellite services and other services

SIA opposes the use of market-based mechanisms for the allocation of spectrum between satellite services and ground-based technologies. This opposition is based on the unique need of satellite services for regional and international allocations As discussed below in connection with the assignment of spectrum, the kind of action that the FCC takes in allocating spectrum domestically is only part of what is required for an effective allocation of satellite spectrum. A successful bidder in the U.S. auction would be subject to extortion by other countries.

Any market-based mechanism for spectrum allocations would have to recognize the need of satellite systems for nationwide allocations. Spectrum would have limited utility for satellite use if it was divided into dozens of metropolitan or regional trading areas. Also, the difficulty of sharing with incumbent terrestrial services is heightened by the relative difficulty of isolating a small geographic area.

Another important consideration is the intangible benefit from satellite services that may not be reflected in satellite industry efforts to acquire spectrum through market mechanisms. Satellites contribute to the provision of universal service, providing unique coverage of rural and remote areas that, as with other components of universal service, have important, but non-market value.

III. Spectrum assignment

There is no specific international assignment process for satellite licenses, but there is a critically important international process for coordinating the use of satellite spectrum among various foreign systems With a few exceptions (involving DBS spectrum and certain FSS spectrum, which have been the subject of *a priori* planning among national administrations), the use of satellite spectrum is subject to a process established by the ITU's International Radio

Regulations, whereby the ITU publishes technical descriptions of proposed systems and negotiations follow with national administrations that are concerned about the possibility of interference by such systems with their own terrestrial or satellite systems. This coordination regime combines principles of "first come-first served" with an obligation that system operators use efficient technology and that incumbents attempt to accommodate new entrants. As a result, in many cases, the license the FCC issues for a satellite system cannot identify how much spectrum from the particular frequency band will initially be available to the licensee. Moreover, the amount of spectrum that is available to the licensee is subject to change over time as new, foreign systems seek access to the band.

The international frequency coordination process has been the subject of increasing attention, as the use of satellites and the number of satellite registrations at the ITU have increased. SIA supports efforts to consider modest reforms to the present system, such as improvement in the ITU's data management system to remove any backlog of filings, and consideration of ways to increase the number of satellites that can efficiently share a given band.

The domestic process of assigning licenses to satellite system operators has always been characterized by the ability to license all qualified applicants. The reasons for this include:

- satellite manufacturers and others have continually made improvements in the technology to permit increases in capacity using the same spectrum

- improvements in technology have permitted satellites to use higher frequency bands that are generally less congested

- the Commission has been innovative in developing ways to accommodate legitimate new systems, including: reducing orbital spacings; promoting intraservice sharing; and encouraging settlements

SIA urges the Commission to continue to strive to authorize all legitimate proposals to construct and operate satellite systems. SIA strongly opposes the use of auctions to license satellite systems. As an initial matter, it is premature to conclude that there is any mutual exclusivity among satellite system proposals; without mutual exclusivity, auctions are clearly inappropriate. The U.S. government and the satellite industry historically have been very successful in avoiding mutual exclusivity.

In addition, the regional and international nature of satellites and the increasing focus of the U.S. satellite industry on the development of regional and international markets makes auctions uniquely inappropriate for satellites. The reasons for this include the following:

1. The sequential auctions that are likely to occur (as one country or region after another conducts its own auction or assesses fees for the right to operate in its territory) are likely to result in extortion of U.S. satellite companies.

2. To increase revenues, countries conducting auctions will have an incentive to

conduct global auctions or to restrict the supply of satellite spectrum. This could result in the warehousing of spectrum and orbital resources, implementation of *a priori* planning, and opposition to new allocations of satellite spectrum. Any of these would reduce opportunities for U.S. companies and restrict output that would otherwise be available to consumers.

3. Since all the U.S. can practically auction is landing rights in the U.S., the revenues that other countries would collect from auctions or from charging fees that correlate to auction prices paid elsewhere are likely to be several times larger than whatever auction revenue is collected by the U.S. Treasury. This means a huge outflow of U.S. dollars and at least a complete offset of the auction revenue collected by the U.S. Treasury.

4. The added costs and incalculable risk created for U.S. satellite companies are certain to have an impact on the generation of jobs in the U.S. economy.

5. U.S. auctions might encourage satellite operators to look to foreign administrations for sponsorship, which will lead to the U.S. ceding regulatory leadership to other administrations and multinational organizations.

For all of these reasons, SIA urges the Commission to affirmatively repudiate the use of auctions for future satellite licensing.

In addition, SIA supports the following policies with respect to satellite licensing:

- maintain reasonable build-out requirements

- maintain reasonable oversight of technology to promote efficient use or public resources.